



Michael D. Zagata  
Commissioner

## MEMORANDUM

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Previous Date: July 1, 1989

Reissued Date:

**TO:** Regional Water Engineers, Bureau Directors, Section Chiefs

**SUBJECT:** Division of Water Technical and Operational Guidance Series (1.3.1.A)

**TOTAL MAXIMUM DAILY LOADS AND WATER QUALITY-BASED EFFLUENT LIMITS**

**AMENDMENT - ORGANIC SUBSTANCES**

(Originator - Albert W. Bromberg)

### PURPOSE

Ambient background concentrations of pollutants should be taken into account in the analysis of water quality. This TOGS amendment describes the procedure for recognizing the presence of ambient background concentrations of persistent organic substances in the development of water quality-based permit effluent limits.

### DISCUSSION

The presence of background concentrations of pollutants in receiving waters affects the process for establishing water quality-based effluent limits. This situation is recognized in the New York State Water Quality Standards, Part 702.16(b)(1):

When deriving a water quality-based effluent limitation from a surface water standard or guidance value, the department may take into account factors including, but not limited to, analytical detectability, treatability, natural background levels and the waste assimilative capacity of the receiving waters.

The issue of background concentrations is usually not clear when dealing with organic substances. Many organics occur naturally as a result of the decomposition of plant and animal life. They become of concern from an environmental standpoint when complexed with metals, halogens, sulfides and amino groups. These complexing processes occur slowly in nature and usually result in low concentrations. It is, therefore, difficult to identify naturally occurring compounds and to deal with them in a wasteload allocation context.

Certain organic substances are usually man-made and have a very low probability of being formed naturally. Examples of such substances are pesticides and other organic chemicals such as PCBs, Aldrin/Dieldrin, dioxins, DDT/DDD/DDE, Endosulfan, Endrin, Heptachlor, Hexachlorocyclohexanes and Mirex. For these types of substances, a method of applying water quality standards (and guidance values) and developing effluent limits is recommended.

The United States Food and Drug Administration (USFDA) has established action or tolerance level limitations for selected contaminants in the edible portion of fish. These contaminants, which usually fall into the category of man-made organic substances, bio-accumulate through the food chain from concentrations found in bottom sediment and from direct adsorption through the gills from concentrations in the water column. When contaminant levels in fish flesh exceed the recommended federal action or tolerance limitations, the possibility exists that a significant portion of this contamination comes from the water column even if the actual concentration of the pollutant in the water is below the analytical detection level. In such a situation, an argument can be made that the applicable water quality standard or guidance value for that contaminant is exceeded in the water column of the waterbody segment in which the contaminated fish were found.

#### **GUIDANCE**

The following guidance should be applied to the development of water quality-based effluent limits.

Available water quality data should be reviewed to determine ambient levels in relation to the water quality standards (or guidance values). If ambient data

are not available, a request for the collection of such data may be made to the Quality Assessment Section, Bureau of Monitoring and Assessment. In the absence of any data, it may be assumed that the background concentration is zero for the initial analysis.

Water quality-based effluent limits should be established consistent with Section 702.16 of the Water Quality Regulations concerning analytical detectability, treatability, natural background, waste assimilative capacity of the receiving water and reasonableness. Interpretation with regard to analytical detectability should be made by the Bureau of Wastewater Facilities Design in conjunction with the Bureau of Technical Services and Research. Interpretation of treatability should be made by the Bureau of Wastewater Facilities Design. Interpretation of background and waste assimilative capacity should be made by the Bureau of Monitoring and Assessment.

When ambient water quality data indicate that concentrations of (man-made) organic substances may be approaching or exceeding the standard or guidance value, the standard or guidance value should be applied as an effluent limit.

When ambient water quality data indicate that concentrations are non-detectable but possibly above the standard, the detection of organic substances in fish flesh which exceed the USFDA action or tolerance levels should be acknowledged as indicative of water quality standard exceedences. In this situation, consideration should be given to applying the standard or guidance value as a water quality-based effluent limit.

When ambient water quality data indicate that concentrations are non-detectable or significantly below the standard, an allowable load based on the standard and the critical low flow should be established. This allowable load should be allocated to all dischargers of the substance in the basin to establish a water quality-based effluent limit.

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